DOCUMENT RESUME

ED 049 836 PS 004 638

AUTHOR	Lewis, Michael; Wilson, Cornelia D.
TITLE	Infant Development in Lower Class American Families.
INSTITUTION	Educational Testing Service, Princeton, N.J.
SPONS AGENCY	National Science Foundation, Washington, D.C.
PUB DATE	Apr 71
NOTE	24p.; Paper presented at the meeting of the Society for Research in Child Development, Minneapolis, Minnesota, April, 1971
EDRS PRICE	EDRS Price MF-$0.65 HC-$3.29
DESCRIPTORS	*Behavior Patterns, Caucasians, Child Rearing, Cognitive Development, *Infant Behavior, Lower Class, Middle Class, Middle Class Mothers, *Mothers, Negroes, Negro Mothers, *Parent Child Relationship, Social Class, *Social Differences
IDENTIFIERS	Bayley Mental Development Index, Escalona and Corman Object Permanence Scales

ABSTRACT

This study was conducted to observe the effects of social class on the interaction of mothers and their 12-week-old infants. Data on the infants' cognitive and attentive behavior was also obtained. Each of 32 white and black infants from five different levels of social class was observed at home for two full hours of waking time. Observed infant behavior included move, vocalize, fret/cry, play, noise, and smile. Findings indicate that lower SES infants vocalize and smile more and fret/cry less than upper middle SES infants. Maternal behaviors of touch, hold, smile, look, and play were more frequent among lower SES than middle SES mothers, and lower SES mothers spend more time watching TV than the middle SES mothers. There is a relatively strong relationship between infant and maternal behavior. Middle SES mothers vocalize when their infants vocalize, touch and hold them when they fret and watch them play. Lower SES mothers tend to touch their infants when they vocalize, when they cry and when they are at play. There were no class differences on the two infant mental tests. Performance on a measure of attention indicated that two-thirds of the middle class infants failed to show response decrement while all the lower class infants demonstrated response decrement. In general, this study supports the presence of social class differences in terms of both cognitive and attentive behaviors.

ED049836

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

Infant Development in Lower Class American Families[1]

Michael Lewis and Cornelia D. Wilson
Educational Testing Service

In any discussion of social class, it is necessary to remember that class is not in itself a psychological variable. The same is true of cultural differences. Both class and culture are carrier variables in which meaningful psychological phenomena may be found. While this is a simple truth, it is often forgotten in the excitement of demonstrating differences among peoples.[2] Class and culture are used to explain differences, rather than treated as media which provide the variability necessary to help pinpoint the processes at work. Psychological concepts and processes must be observed within these carrier variables. There is, however, no guarantee that individual differences will appear within these different groups nor for that matter should investigation cease at the demonstration of these differences. It is the process which produces these differences which are at the heart of scientific inquiry. This method can be applied to the study of caretaking and its effects on infant development. The present discussion exploring social class differences aims at understanding underlying processes rather than demonstrating class differences. In order to do this it is necessary as a first step to describe differences if they are present.

PS 004638

Efforts aimed at exploring social class differences in infancy have met with mixed success. Wachs, Uzgiris and Hunt (1967) have reported social class differences in tasks involving motor imitation and verbal facility as well as on subtests of the Infant Psychological Development Scale based on Piaget's model of intellectual development. Tulkin and Kagan (1970) report

---

Paper presented at Society for Research in Child Development meetings, Symposium on Cross-Cultural Studies of Mother-Infant Interaction: Description and Consequence, Minneapolis, April 1971.

social class differences in maternal behavior toward their 10-month-old infant girls. Other studies, however, have been unsuccessful in discovering social class differences in the opening years of life. Bayley (1965) reported no social class differences in infants of 1-15 months on the revised forms of her scales of motor and mental development. Golden and Birns (1968) found no class differences in Negro infants of one to two years of age on the Cattell Infant Intelligence Scale and on the Piaget Object Scale. More directly relevant to the present study, Levine, Fishman and Kagan (1967) reported no class difference in the 4-month-old infant when observed in the home. Messer and Lewis (1971) in a study of attachment and play behavior in year-old infants of different social class failed in general to find any class differences save that middle class infants vocalized seven times more frequently in the presence of their mothers than did lower class infants.

The data on social class differences--not to mention the lack of explanation--are far from clear. At issue is the question: Do the effects of social class differences--which appear so clearly at later ages (see Olim, Hess & Shipman, 1965 and Bee, et al., 1969 for example)--make themselves felt at earlier ages? If social class is a carrier variable for important psychological variables, one might expect class to be related to behavior at all ages. The lack of such evidence from the research data to date forces us to examine some of the possible reasons. The first and simplest is a measurement problem. There are highly limited numbers of infant behavior differences that can easily be observed; that is, all infants have these few behaviors in their repertoire. The second reason

may have to do with the accumulated effects of the psychological variables carried by social class. The effect of social class may be cumulative, its influence being slight in very early development but increasing with time. Thus, if caretakers in one class included or omitted a psychologically relevant behavior, the effect might not be immediately observable. One would expect that social class differences should increase with age if this analysis is correct. A third possibility is that class effects have their greatest impact on psychological phenomena which emerge at some future date. Thus, there would be no class effects until a more advanced (in terms of process) behavior emerged. As a corollary to this we might further argue that early functions might be affected one way by class variables while later functions would be affected in another.

Before the various alternative explanations for the general paucity of evidence of class effects on infant behavior are considered, it is extremely important both theoretically as well as empirically to insure that the measurement consideration is properly dealt with. It is possible that rather than any elaborate class effect-developmental unfolding interaction, all or most all that is necessary to explain the failure to show class differences in infancy is the lack of sophisticated measurement procedures.

Because social class variables affect the infant through the differential behavior of its caretaker(s), it was thought that a first step was to examine the mother-infant interaction. While much import is attributed to the interaction between mother and infant, studies in general have either discussed it theoretically (for example, Gewirtz, 1969) or have presented data on mother and infant behavior which is not necessarily interactive (for

example, Moss, 1967). The present study was undertaken to study the effects of social class on the behavior of the mother and her 12-week-old infant, and more importantly, on their interaction. Also obtained was data on the infants attentive and cognitive behavior.

Observational Data

Each infant was seen at home for two full hours of waking time. Thirty-two infants, white and black, from the five social class categories of Hollingshead's Two Factor Index of Social Position (1957) were seen. This scale utilizes subjects' education and occupation in a weighted score. Five social classes are possible going from upper middle SES, I(high executives, proprietors of large concerns and major professionals in terms of occupation; and college and graduate school trainees in terms of education) to lower SES, V(unskilled employees in terms of occupation and less than seven years of school in terms of education). In social class I there were nine infants (four boys and five girls); class II there were five infants (two boys and three girls); class III, eight infants (five boys and three girls); class IV there were three infants (two boys and one girl); and class V there were seven infants (four boys and three girls). Sex differences have been reported elsewhere (Lewis, 1971); the present analysis will be concerned only with class differences. Because of the small sample size interactive effects of class x sex cannot be discussed.

The observation data were collected using a check list sheet (see Lewis, 1971; Lewis & Goldberg, 1969, for a full discussion). Each sheet represented 60 seconds, divided into six 10-second columns. Infant behaviors included vocalize, move, fret/cry, play, noise, smile, while maternal behaviors included touch, hold, vocalize, look, smile, play, rock, vocalize to others,

read or watch TV. Each 10 seconds the observer checked off the occurrence of both infant's and mother's behavior, also recording when possible which behaviors preceded which. Since two hours of waking time were obtained for each infant, 720 10-second scores were possible for each behavior. Various levels of interactive analysis are possible with this type of data. In the following discussion some of the more obvious will be presented (see Lewis, 1971 for a full discussion).

Frequency distribution. The lowest level of interactive analysis is the frequency data, that is, how much vocalization, quiet play, smiling, etc., the infant exhibited in the two hours of observation. The same analysis is possible for the mothers' behavior (see Table 1).

Insert Table 1 and Figure 1 about here

Figure 1 presents the mean frequency for each of the six infant behaviors. Observe that for infant vocalization there is a significant social class effect. Lower class infants (II) vocalize more than twice the amount of middle class children (I) (overall class differences by Kruskal-Wallis $H = 9.10$, $p < .06$). Similarly, they show more than twice the smiling behavior ($H = 29.71$, $p < .001$). Finally, the lower class infants show less than half the amount of fret/crying than do middle class infants (this comparison by Mann-Whitney U Test, $U = 12$, $p < .05$). Lower class infants also show more movement than other infants--more than two and one-half times ($H = 8.99$, 10 $p < .05$), while middle class infants showed significantly more noise/nonvocalization ($H = 29.85$, $p < .001$). There were no play differences between classes.

PS 004 638

Insert Figure 2 about here

The mothers' behavior likewise shows the effect of social class, however these differences are much less clear (see Fig. 2). For maternal touch and hold behaviors there is an almost perfect monotonic increase in frequency of occurrence as social class levels decreased. Thus, lower SES mothers touched their infants a bit less than twice as much and held their infants 50 per cent more than middle SES mothers (significant only for touch, Mann-Whitney U Test, $p < .05$). While vocalization data for the infants varied widely, there was no difference in the amount of vocalization the mothers of different social classes exhibited. Smiling data like touch and hold show an almost perfect monotonic increase with decreases in the class level. Lower SES mothers smile more than three times as often as middle SES mothers (Mann-Whitney U Test, $p < .05$). Look and play behaviors also indicate that mothers from the lower SES exhibit more of these behaviors than mothers of the middle SES, in the case of play behavior more than two times as much (Mann-Whitney U Test, $p < .05$). Interestingly, lower SES mothers spend more time reading or watching TV than middle SES mothers (Mann-Whitney U Test, $p < .05$).

To summarize the infant behavior frequency data, lower SES infants vocalize and smile more and fret/cry less than upper middle SES infants. Maternal behaviors of touch, hold, smile, look and play were more frequent among lower SES mothers than middle SES mothers. Maternal vocalization shows no SES differences, indicating that this is the only maternal behavior--in terms of frequency--which does not favor the lower SES child. Moreover, lower SES mothers spend more time watching TV than the middle SES.

Insert Table 2 about here

Because the sample size for any of the five class categories was too small, an analysis over all 32 subjects was performed to correlate infant and maternal frequency behavior. The results indicate that there is a relatively strong relationship between infant and maternal behavior. For example, mothers who vocalized and smiled a great deal had infants who vocalized and smiled a great deal (rho = .43, $p < .05$, and .53, $p < .01$ respectively). In general, the more positive the maternal behavior, the less infant fret/cry (rho = -.36, $p < .05$ for hold and -.43, $p < .05$ smile). Like smiling, maternal play behavior was positively correlated with infant vocalization ($r = .49$, $p < .01$) and smile ($r = .45$, $p < .01$). Finally, maternal looking was positively associated with infant movement and noise ($r = .44$ and .37, $p < .05$, respectively). See Table 2 for results.

Simultaneous Behavior within 10-Second Units I

This first interactive analysis examines the number of 10-second units in which both infant and maternal behavior occurred. The data indicate a greater number of interactive units for lower SES infants. The mean values were: 296.77, 264.00, 420.87, 348.66 and 359.28 for social class I through V, respectively (overall class differences H = 10.78, $p < .05$). However, there were no class differences in the ratio of the number of interaction units to the overall number of infant behavior units, or units in which at least one infant behavior occurred (.69, .59, .88, .78 and .69 for social classes I through V, respectively).

Simultaneous Behavior within 10-Second Units II

This interaction analysis examines the interactions among specific pairs of behaviors (what happens when something else is happening). It is here where it will be possible to observe differential maternal behavior, not considering frequency of occurrence, but rather style or quality differences. The following analysis was performed for each infant behavior. Essentially, we determined the most frequent maternal behavior associated with the specific infant behavior; for example, given an infant vocalization, what was the most frequent maternal behavior? Social class differences were looked at in this fashion. In the following discussion it must be remembered that the sample size is rather small and that the results are more often strong trends rather than statistically significant correlations.

Infant vocalization data indicate interesting and potentially meaningful class differences. In general, the response to an infant vocalization is a maternal vocalization, this the most frequently occurring maternal behavior. There is, however, a clear class difference, namely, it is middle rather than lower SES mothers who are more likely to respond to the infants' vocalization with one of their own. The percentages of mothers responding with a vocalization are .78, .60, .75, .33 and .43 as a function of I, II, III, IV and V class categories. Thus, while there is no class difference in amount of maternal vocalization, the data strongly suggest that middle SES mothers vocalize back to their infants' vocalizations more than do lower SES mothers ($\chi^2 = 3.14$, $p < .10$). It was not the frequency of vocalization but its use. This becomes clearer when one observes other infant behavior categories, for example, fret/cry and movement. For fret/cry the lower SES mother

is more likely to vocalize than the middle SES mother (65 vs. 33 per cent of mothers), while the middle SES mother is more likely to respond to a fret/cry with a touch or a hold behavior (28 vs. 15 per cent of the mothers). Finally, the play data indicate that middle SES mothers do more looking in response to their infants' play, while lower SES mothers are more likely to vocalize.

To summarize the results, middle SES mothers vocalize when their infants vocalize, touch and hold them when they fret/cry or show large physical movement and watch them while they play. Lower SES mothers tend to touch their infants when they vocalize and vocalize to them when they fret/cry, show large physical movements and when they are at play. In general, then, the middle SES mother does not do more for her infant than the lower SES mother, but rather has a different style of responding. The consequences of this different style are yet to be explored.

Measures of Cognition and Attention

In addition to observing these infants at home, two mental tasks--the Bayley Mental Development Index and the Escalona and Corman Object Permanence Scales--and a visual attentional task were administered.

Mental Development Index. The data for the population of all 32 infants are skewed toward higher performance on the MDI; the mean is 122.2 with a range of 97 to 147. There were no class differences: 119.1, 124.2, 124.3, 121.0 and 122.2 for classes one through five, respectively.

Object Permanence Task. In general, few of the items are possible to solve for 12-week-old infants. The group was able to pass on the average 2.44 items with a range of one to six. Again, there were no class differences:

2.15, 2.80, 2.50, 2.00 and 2.50 respectively. Notice, however, that in both tasks the middle class infants (I) scored least well.

Attention. Each infant received six trials of a complex multicolor lined visual pattern followed by a seventh trial of a similar pattern of curved lines. Each trial was 30 seconds long with a 30-second intertrial interval. Fixation time along with cardiac responsivity were obtained (see Lewis et al., 1970 for details of the procedure). In general, earlier research has indicated that infants older than 12 weeks show response decrement to the redundant stimulus and show response recovery when the stimulus is altered. Both the amount of decrement and amount of recovery have been used as indexes of cognitive function, the greater decreases and recovery associated with more developed function. The mean score for the middle SES (I) was 0.00 indicating no decrement, while for the lower SES (V), the score was 0.58 (Mann-Whitney U Test, $p < .001$). In fact, there was an orderly progression of decrement as a function of social class (0.00, 0.09, 0.17, 0.17 and 0.58 for classes I through V, respectively). Thus, lower SES infants showed greater decrement than middle SES infants. The data are most clear when we consider the number of subjects failing to show decrement, for middle SES (I) it is 63 per cent, while for lower SES (V), it is zero per cent; in other words, two-thirds of middle class infants failed to show decrement, while none of the lower class infants failed to show any decrement. The percentage scores were 63, 50, 38, 50, 00 for classes I through V, respectively.

Response recovery showed a similar pattern: lower SES infants (V) showed the greatest recovery to the novel stimulus, while the middle class (I) showed the least (overall class comparison, $H = 26.02$, $p < .001$).

Observation of the percentage of infants who failed to show recovery reveal this class effect: for classes I through V, 63, 75, 25, 0, 20 per cent failed to show recovery.

The cognitive and attentive data of these infants suggest class differences in performance. Lower SES infants appear to show somewhat superior cognitive functioning on the Bayley Scale of mental development. More clear, however, are the class differences in attention. Both measures of attention reflect perceptual-cognitive ability (see Lewis et al., 1970), that is, recovery to novelty and decrement to redundancy are biologically adaptive functions of organisms. Lower SES infants seem to show superior performance at 12 weeks of age.

Discussion

The social class differences presented here are based on a small sample. Unlike most studies, this study attempted to sample not just two social class points but all five as described by Hollingshead (1957). Moreover, our lowest class level, unlike that in many studies, represents the lower SES. In terms of the findings for maternal behavior, the results are in sound agreement with other similar studies, for example, that of Tulkin and Kagan (1970). But unlike these studies, the present study found social class differences in 12-week-old infant behavior both in terms of such responses as vocalization as well as in their attentive behavior.

The purpose of our undertaking this study was not only to point out individual differences as a function of social class; to find and state these leads to no understanding of process. From what we now know, clear and unmistakable social class differences appear in the preschool period (Coleman, 1966;

Hess & Shipman, 1968; Palmer, 1970). Data from a wide range of studies indicate language, problem solving and conceptualization weakness in children of lower class backgrounds. Thus, whatever psychological variables are carried by social class, their effects are immediately visible in the three-year-old and older child.

The question that we must address ourselves to is, given the condition of the three-year-old in terms of cognitive function, and given what we know about caretaking practices, how do these interact to form deficient, normal or superior functioning? Do individual differences in mother-infant behavior aid us in this analysis?

One possible strategy for investigating this problem is to list in some fashion what we know to be important in the perceptual-motor-cognitive growth of infants. After constructing such a list--never expecting it to be complete and recognizing that it can include a wide variety of data--we can compare lower and middle class mothers and infants and see how they differ.

1. Attachment - a wide range of observers have argued that only within the context of a sound attachment relationship with the mother or some caretaker can intellectual development occur (Bell, 1970; Bowlby, 1969; Erikson, 1963).

2. Stimulation - starting in part as a rebellion against the notion of the importance of attachment, investigators have argued that what is crucial for sound intellectual growth is high stimulation levels. Stimulation is often defined in terms of motor as well as sensory experience but most stimulation hypotheses have in mind the amount of sensory stimulation as the critical variable (Brody, 1951; Held & Hein, 1963; Hunt, 1965; White, 1967).

3. Reinforcement - the history and nature of the reinforcement or contingency of the infant's behavior and the environmental response--either toy or human--is for some the major variable in intellectual growth. This reinforcement or contingency can act either to increase the occurrence of positive behaviors or can act on the general motivational system of the infant (Gewirtz, 1969; Lewis & Goldberg, 1969).

4. Style of response - the concept is less readily definable than the previous ones because it rests not so much on amount or contingency but on the nature of the response and the signal to noise ratio of behaviors. For example, in two cases, mothers respond contingently to their infants' behavior but with different responses and a different number of responses. In one case, the mother responds to her infant's vocalization with a vocalization and in the other, the mother responds to her infant's vocalization with a touch. In both cases there is stimulation and contingency, but the style and content of the response is different. Alternatively, one mother may vocalize to her infant without doing anything else, while another mother may vocalize as well as touch and rock. In both cases, maternal vocalizations occurred, but in one it had a higher signal to noise ratio than in the other.

Now observe social class differences in early infancy and see how the infant-mother relationships differ on these four dimensions. Take first attachment. In the present study, lower class mothers showed more behaviors which should be associated with strengthening the attachment bond: more smiling, holding, etc. The only exception and one also found in the Tulkin and Kagan (1970) study was that the lower class ~~infants~~ mothers watched more TV.

One might argue that there still may be attachment differences among the classes when the infants are older. Messer and Lewis' (1971) results for lower SES one-year-old infants indicate this not to be the case. Attachment differences do not appear at older ages.

Stimulation is the second category. This can easily be done away with as a viable alternative for several reasons: first, because there is no indication that lower SES infants receive less stimulation--for example, they watch and listen to more TV than middle SES infants and second, anthropological observation indicates more stimulation. It also indicates that stimulation is less directed, which leads to the next consideration.

Reinforcement or contingency behavior on the part of the mother does not support social class differences. In the present data, interactive units as a function of infant frequency yield no difference among the various classes. In fact, the data tend to indicate that the lower SES infants are receiving more contingent behavior. While there is no direct evidence of the lack of contingent behavior on the part of the mother toward her infant, a general analysis has been made of the lower SES adult feelings of powerlessness. This feeling results from the failure of the environment to be responsive to his needs and action. That this powerlessness is passed on is not questioned and the failure to act contingently toward children would be one method of doing this.

The failure of the data to support adequately the attachment, stimulation or reinforcement-contingency factors as causes for subsequent social class differences leaves the consideration of style of response, such as the nature of the response as well as other features already mentioned. Consider, for example, maternal vocalization data. Amount of vocalization

does not differ across social class. Observation of the data, however, suggests that vocalization as a ratio of the other maternal behaviors is higher for the middle class than for the lower class (24, 25, 23, 24, 18 per cent across classes I to V). More important, however, is the relationship of the mother's behavior to the infant's behavior. Again, observe vocalization behavior. When an infant vocalizes he is responded to by his mother equally over all the five social classes. However, the middle SES mother responds to her infant's vocalization with a vocalization, while this is less true for the lower SES mother. It is to be noted that this same behavior is found toward girl versus boy infants, the girls' vocalization resulting in more maternal vocalization than boys' (Lewis, 1971). This same type of analysis can be made for each infant behavior and the data indicate not a stimulation or contingency difference but rather a style difference in type of response.

For both girls and middle SES subjects, infant vocalization is followed more by maternal vocalization than for boys and lower SES subjects. That girls and middle SES subjects have faster language acquisition may be no coincidence. How should this affect language development and intellectual growth? Certainly the process is not clear. However, the recent work of Sigel (1968) may be relevant. Sigel uses a notion of distancing to account for the ability of some children to deal with higher cognitive functioning such as representational thought. By distancing he means the concept which denotes "behaviors or events which separate the child cognitively from the immediate behavioral environment." Under this theory, greater distancing leads to more representational thought. Is it possible that different styles

of maternal response can lead to more or less distancing? We hypothesize that this might be the case for social class differences. For example, touching in response to an infant's vocalization might be less of a distancing response than vocalization in response. Other distancing responses are looking and smiling. It is interesting to note that vocalization and looking are the responses which do not significantly favor the lower SES mother, while the rest of the behaviors observed do. As Sigel points out, increasing the distance between self and object--in the early case, mother--may contribute to the development of representational thought and perhaps cognitive growth in general. This would then account for the deficit in lower SES children's behavior at ages past two. Why then lower SES superior performance in infancy? It might well be argued that while distancing (vocalization responses, etc.) facilitates representational thought--after two years--proximal interaction such as touching, rocking, etc. facilitates early prerepresentational thought. This would agree with Gebér's (1958) and Gebér and Dean's (1957a,b) findings that infants receiving great amounts of proximal interaction are precocious for the first two years and retarded thereafter as compared to infants with less initial proximal interaction.

These comments are speculations and should be treated as such. They do, however, provide a framework for future research and reinforce the notion that individual differences are not research ends in themselves but only the structure for the discovery of process.

References

Bayley, N. Comparisons of mental and motor test scores for ages 1-15 months by sex, birth order, race, geographical location, and education of parents. Child Development, 1965, 36, 379-411.

Bee, H. L., Van Egeren, L. F., Streissguth, A. P., Nyman, B. A., & Leckie, S. L. Social class differences in maternal teaching strategies and speech patterns. Developmental Psychology, 1969, 1, 726-734.

Bell, S. The development of the concept of object as related to infant-mother attachment. Child Development, 1970, 41, 291-311.

Bowlby, J. Attachment and loss. Vol. I. New York: Basic Books, Inc., 1969.

Brody, S. Patterns of mothering. New York: International Universities Press, 1951, 1966. Pp. 7-42.

Coleman, J. S., et al. Equality of educational opportunity. Washington, D. C.: U. S. Department of Health, Education, and Welfare, Office of Education, 1966.

Erikson, E. Childhood and society. (2nd ed.) New York: Norton, 1963.

Gebér, M. L'enfant africain accidentalise et de niveau social superieur en Uganda. Courrier, 1958, 8, 517-523.

Gebér, M., & Dean, R. F. A. Gesell tests on African children. Pediatrics, 1957, 6, 1055-1065. (a)

Gebér, M., & Dean, R. F. A. The state of development of newborn African children. Lancet, 1957, I, 1216-1219. (b)

Gewirtz, J. Levels of conceptual analysis in environment-infant interaction research. Merrill-Palmer Quarterly, 1969, 15, 7-41.

Golden, M., & Birns, B. Social class and cognitive development in infancy. Merrill-Palmer Quarterly, 1968, 14, 139-149.

Held, R., & Hein, A. Movement-produced stimulation in the development of visually-guided behavior. Journal of Comparative and Physiological Psychology, 1963, 56, 872-876.

Hess, R. D., & Shipman, V. C. Maternal influences upon early learning: The cognitive environments of urban pre-school children. In R. D. Hess and R. M. Bear (Eds.), Early education. Chicago: Aldine, 1968.

Hollingshead, A. B. Two factor index of social position. U.S.: Author, 1957.

Hunt, J. McV. Intrinsic motivation and its role in psychological development. In D. Levine (Ed.), Nebraska Symposium on Motivation, Vol. 13. Lincoln: University of Nebraska Press, 1953. P. 85.

Levine, J., Fishman, C., & Kagan, J. Sex of child and social class as determinants of maternal behavior. Paper presented to the American Orthopsychiatric Association, Washington, D. C., March, 1967.

Lewis, M. State as in infant environment interaction. Paper presented at the Merrill-Palmer Conference on Infant Behavior, February, 1971. Merrill-Palmer Quarterly, in press.

Lewis, M., & Goldberg, S. Perceptual-cognitive development in infancy: A generalized expectancy model as a function of the mother-infant interaction. Merrill-Palmer Quarterly, 1969, 15(1), 81-100.

Lewis, M., Goldberg, S., & Campbell, H. A developmental study of learning within the first three years of life: Response decrement to a redundant signal. Monographs of the Society for Research in Child Development, 1970, 34(9), Serial No. 133.

Messer, S., & Lewis, M. Social class and sex differences in the attachment and play behavior of the year-old infant. Merrill-Palmer Quarterly, in press.

Moss, H. A. Sex, age, and state as determinants of mother-infant interaction. Merrill-Palmer Quarterly, 1967, 13, 19-35.

Olim, E., Hess, R., & Shipman, V. Maternal language styles and their implications for children's cognitive development. Proceedings of the 73rd Convention of the American Psychological Association, September, 1965.

Palmer, F. Personal communication. Unpublished research reported at colloquium at Educational Testing Service, 1970.

Sigel, I. The distancing hypothesis: A causal hypothesis for the acquisition of representational thought. Prepared for presentation at the symposium on The Effects of Early Experience, University of Miami, December, 1968.

Tulkin, S. R., & Kagan, J. Mother-child interaction: Social class differences in the first year of life. Unpublished manuscript.

Wachs, T. D., Uzgiris, I. C., & Hunt, J. McV. Cognitive development in infants of different age levels and from different environmental backgrounds. Paper presented to the Society for Research in Child Development, New York, March, 1967.

White, B. L. An experimental approach to the effects of experience on early human behavior. In J. P. Hill (Ed.), Minnesota Symposium on Child Psychology. Minneapolis: University of Minnesota Press, I, 1967. Pp. 201-226.

Footnotes

[1]This study was supported in part by the National Science Foundation, under Research Grant Number 8590, and the National Early Childhood Research Council Grant to Michael Lewis. Special appreciation is given to Pamela Sarett and Yvonne Watson for data collection and Christine Sully for data analysis.

[2]Contemporary psychology--both in terms of the problems posed and the statistical logic employed--is concerned with demonstrating individual differences. It is to be noted that the philosophy of science does not dictate this. Just as revealing would be a psychology in which we seek to find out ways in which people are similar and what manipulations can cause similar performance.

Table 1

Average Frequency of Maternal and Infant

Behavior over Two Hours of Observation

Infant

	Voc	Fret	Movement	Play	Noise	Smile
1	102.44	99.00	75.33	99.00	37.22	23.88
2	121.00	114.80	72.20	142.80	26.80	29.40
3	220.25	60.87	72.00	120.25	9.37	39.00
4	175.67	62.66	48.66	77.33	10.00	24.33
5	235.42	47.42	189.42	93.85	25.14	53.71

Mother

	Touch	Hold	Voc	Voc to Others	Smile	Look	Play	Rock	Read/ TV
1	92.22	231.88	227.88	113.33	17.55	169.66	44.88	12.00	25.44
2	135.40	264.80	215.00	61.00	25.20	111.60	84.60	20.80	5.20
3	123.75	352.50	313.87	84.75	35.87	173.25	118.12	5.00	62.00
4	137.66	356.66	293.66	182.66	31.66	166.66	78.00	8.00	8.30
5	163.57	361.57	244.71	77.71	55.57	229.42	110.00	8.00	111.00

Table 2

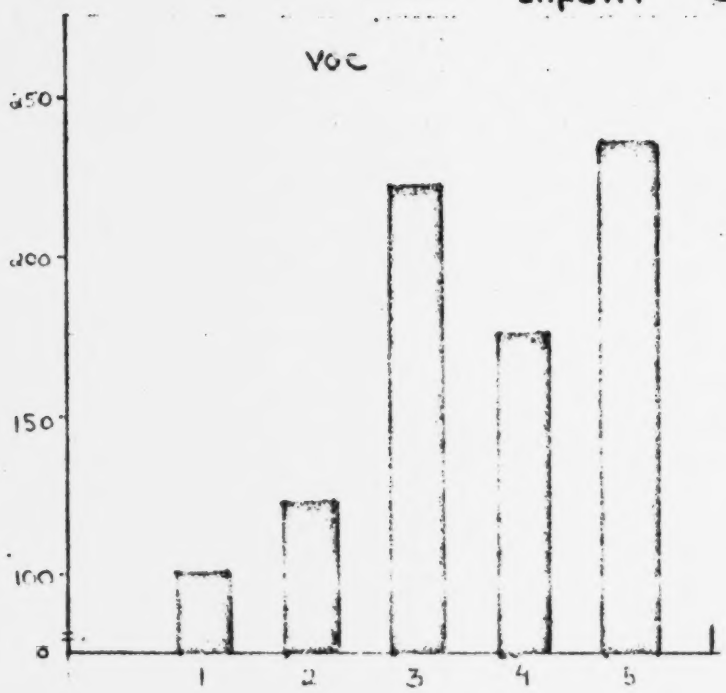
Mother-Infant Behavior Correlations

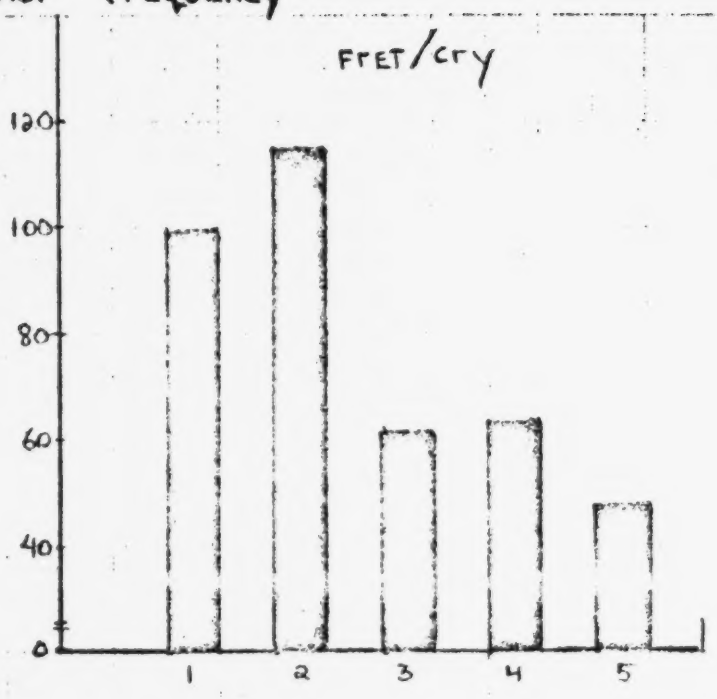
(N = 32)

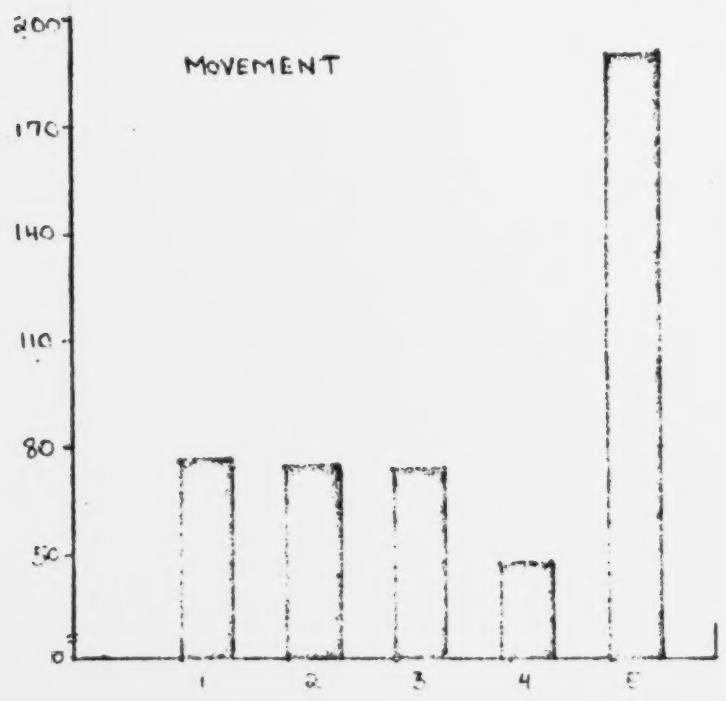
	Rank Order Correlations								
	Mother								
Infant	Touch (Kiss)	Hold	Voc.	Voc. to Others	Smile Laugh	Look	Play	Rock	Read/ TV
Vocalize	.11	.11	.43*	-.28	.39*	.21	.49**	.30	.48**
Fret	-.23	-.36*	.02	.15	-.43*	-.36	-.18	-.09	-.36*
Movement	.05	.13	.09	-.15	.08	.44*	.19	.40*	.37*
Play	-.29	-.32	.01	-.28	.23	.04	.31	.25	.35*
Noise (not voc.)	-.15	-.21	-.09	-.13	-.23	.37*	.05	.16	.08
Smile	-.15	-.01	.20	-.26	.52**	-.25	.45**	-.03	.28

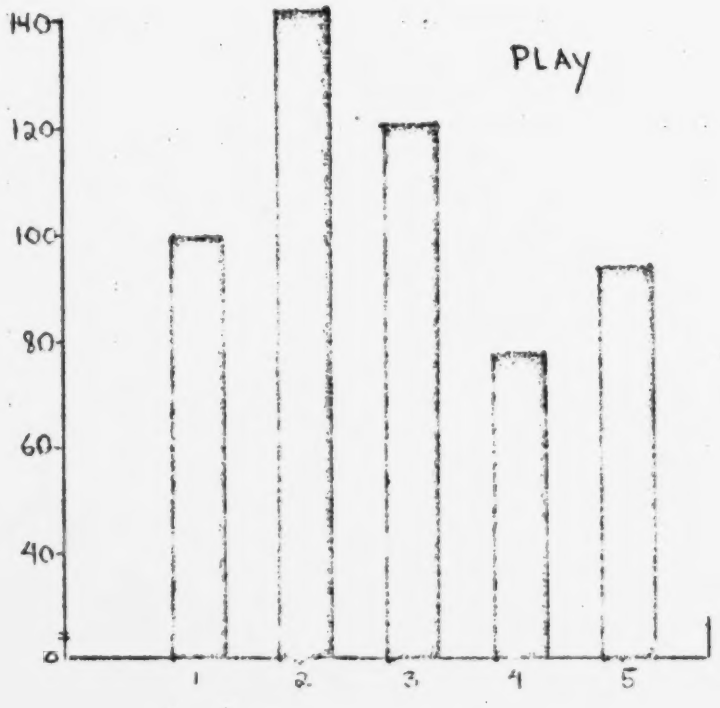
*$p < .05$
**$p < .01$

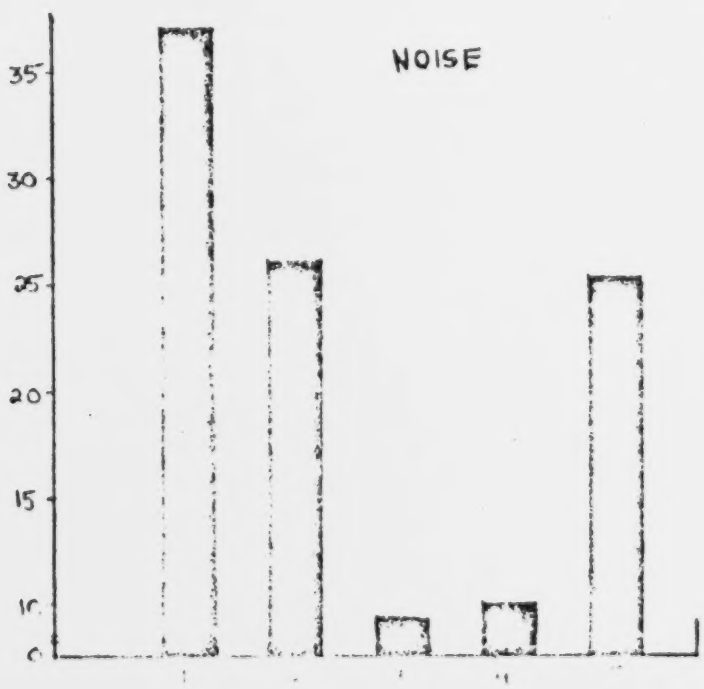
Figure I
Infant Behavior Frequency











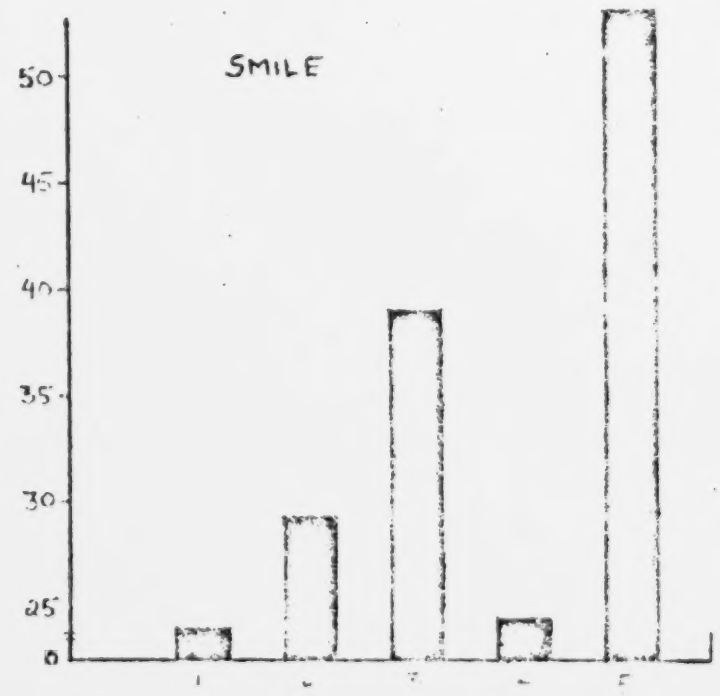


Figure 2
Maternal Behavior Frequency